



**Microsemi Corp.**

The diode experts

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**1N821, A, -1  
thru  
1N829, A, -1  
DO-35**

## FEATURES

- ZENER VOLTAGE 6.2 V AND 6.55 V
- 1N821, 823, 825, 827 AND 829 HAVE JAN, JANTX, JANTXV-1 QUALIFICATIONS TO MIL-S-19500/159
- JANS EQUIVALENT AVAILABLE VIA SCD
- ALSO AVAILABLE IN DO-7 PACKAGE

## MAXIMUM RATINGS

Operating Temperatures: -65°C to +175°C

Storage Temperatures: -65°C to +175°C

DC Power Dissipation: 475 mW @ 25°C

Derating: 3.16 mW/°C above 25°C

## \*ELECTRICAL CHARACTERISTICS

@ 25°C, unless otherwise specified

| JEDEC<br>TYPE<br>NUMBER | ZENER<br>VOLTAGE<br>(Note 1 and 4)<br>$V_Z$ @ $I_{ZT}$ | ZENER<br>TEST<br>CURRENT<br>$I_{ZT}$ | MAXIMUM<br>ZENER<br>IMPEDANCE<br>(Note 3 and 4)<br>$Z_{ZT}$ | VOLTAGE<br>TEMPERATURE<br>STABILITY<br>( $\Delta V_{ZT}$ MAX)<br>-55° to +100°<br>(Note 3 and 4) | EFFECTIVE<br>TEMPERATURE<br>COEFFICIENT<br>$\alpha_{VZ}$ |
|-------------------------|--------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------|
|                         | VOLTS                                                  | mA                                   | OHMS                                                        | mV                                                                                               | %/°C                                                     |
| 1N821                   | 5.9 - 6.5                                              | 7.5                                  | 15                                                          | 96                                                                                               | 0.01                                                     |
| 1N821A                  | 5.9 - 6.5                                              | 7.5                                  | 10                                                          | 96                                                                                               | 0.01                                                     |
| 1N822†                  | 5.9 - 6.5                                              | 7.5                                  | 15                                                          | 96                                                                                               | 0.01                                                     |
| 1N823                   | 5.9 - 6.5                                              | 7.5                                  | 15                                                          | 48                                                                                               | 0.005                                                    |
| 1N823A                  | 5.9 - 6.5                                              | 7.5                                  | 10                                                          | 48                                                                                               | 0.005                                                    |
| 1N824†                  | 5.9 - 6.5                                              | 7.5                                  | 15                                                          | 48                                                                                               | 0.005                                                    |
| 1N825                   | 5.9 - 6.5                                              | 7.5                                  | 15                                                          | 19                                                                                               | 0.002                                                    |
| 1N825A                  | 5.9 - 6.5                                              | 7.5                                  | 10                                                          | 19                                                                                               | 0.002                                                    |
| 1N826                   | 6.2 - 6.9                                              | 7.5                                  | 15                                                          | 20                                                                                               | 0.002                                                    |
| 1N827                   | 5.9 - 6.5                                              | 7.5                                  | 15                                                          | 9                                                                                                | 0.001                                                    |
| 1N827A                  | 5.9 - 6.5                                              | 7.5                                  | 10                                                          | 9                                                                                                | 0.001                                                    |
| 1N828                   | 6.2 - 6.9                                              | 7.5                                  | 15                                                          | 10                                                                                               | 0.001                                                    |
| 1N829                   | 5.9 - 6.5                                              | 7.5                                  | 15                                                          | 5                                                                                                | 0.0005                                                   |
| 1N829A                  | 5.9 - 6.5                                              | 7.5                                  | 10                                                          | 5                                                                                                | 0.0005                                                   |

† Double Anode; Electrical Specifications Apply Under Both Bias Polarities.

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**NOTE 1** When ordering devices with tighter tolerances than specified, use a nominal  $V_Z$  voltage of 6.2 V.

**NOTE 2** Measured by superimposing 0.75 mA ac rms on 7.5 mA DC @ 25°C.

**NOTE 3** The maximum allowable change observed over the entire temperature range i.e., the diode voltage will not exceed the specified mV change at any discrete temperature between the established limits.

**NOTE 4** Voltage measurements to be performed 15 seconds after application of DC current.

**6.2 & 6.55 VOLT  
TEMPERATURE  
COMPENSATED  
ZENER REFERENCE  
DIODES**

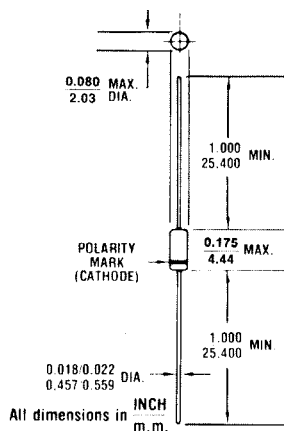


FIGURE 1

## MECHANICAL CHARACTERISTICS

**CASE:** Hermetically sealed glass case, DO-35 (DO-204AH).

**FINISH:** All external surfaces are corrosion resistant and leads solderable.

**THERMAL RESISTANCE:** 250°C/W junction to lead at 0.375-inches from body. Metallurgically bonded DO-35's exhibit less than 100°C/W at zero distance from body.

**POLARITY:** Diode to be operated with the banded end positive with respect to the opposite end.

**WEIGHT:** 0.2 grams.

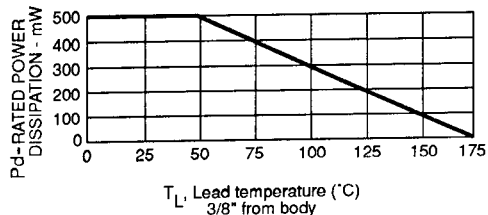
**MOUNTING POSITION:** Any

# 1N821, A, -1 thru 1N829, A, -1 DO-35

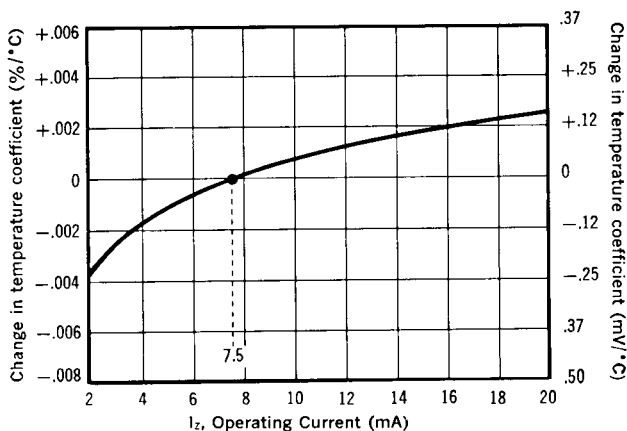
The curve shown in Figure 3 is typical of the diode series and greatly simplifies the estimation of the Temperature Coefficient (TC) when the diode is operated at currents other than 7.5 mA.

**EXAMPLE:** A diode in this series is operated at a current of 7.5mA and has specified Temperature Coefficient (TC) limits of  $\pm 0.005\%/^{\circ}\text{C}$ . To obtain the typical Temperature Coefficient limits for this same diode operated at a current of 6.0mA, the new TC limits ( $\%/^{\circ}\text{C}$ ) can be estimated using the graph in FIGURE 3.

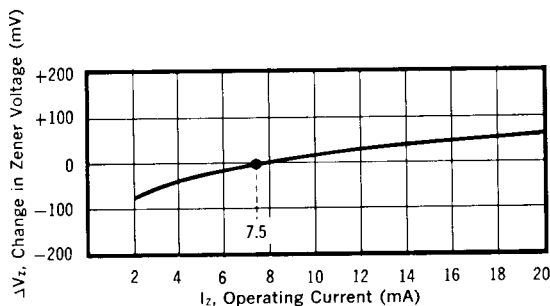
At a test current of 6.0mA the change in Temperature Coefficient (TC) is approximately  $-0.0006\%/^{\circ}\text{C}$ . The algebraic sum of  $\pm 0.005\%/^{\circ}\text{C}$  and  $-0.0006\%/^{\circ}\text{C}$  gives the new estimated limits of  $+0.0044\%/^{\circ}\text{C}$  and  $-0.0056\%/^{\circ}\text{C}$ .



**FIGURE 2** POWER DERATING CURVE



**FIGURE 3**  
TYPICAL CHANGE OF TEMPERATURE COEFFICIENT  
WITH CHANGE IN OPERATING CURRENT



**FIGURE 4**  
TYPICAL CHANGE OF ZENER VOLTAGE WITH  
CHANGE IN OPERATING CURRENT

This curve in Figure 4 illustrates the change of diode voltage arising from the effect of impedance. It is in effect an exploded view of the zener operating region of the I-V characteristic.

In conjunction with Figure 3, this curve can be used to estimate total voltage regulation under conditions of both varying temperature and current.